Amazon Relational Database Service (RDS) is a web service that makes it easier to set up, operate, and scale a relational database in the cloud.

RDS provides cost-efficient, resizable capacity for an industry-standard relational database and manages common database administration tasks.

Relational databases on AWS:

* SQL Server
* Oracle
* MySQL Server
* PostgresSQL
* Aurora
* MariaDB

RDS runs on virtual machines. You cannot log into these operating systems.

Patching of the RDS Operating System and DB is Amazon's responsibility

RDS has two key features:

* Multi-AZ : For Disaster Recovery
* Read Replicas : For performance

DB instances replicas can be created in two ways Multi-AZ & Read Replica, which provide high availability, durability and scalability to RDS.

**Multi-AZ deployments:**

Multi-AZ deployment provides high availability, durability and failover support

RDS automatically provisions and manages a synchronous standby instance in a different AZ (independent infrastructure in a physically separate location)

RDS automatically fails over to the standby so that database operations can resume quickly without administrative intervention in case of

* Planned database maintenance
* Software patching
* Rebooting of the Primary instance
* Primary DB instance connectivity or host failure, or an
* Availability Zone failure

Multi-AZ is available for SQL Server, Oracle, MySQL Server, PostgreSQL, MariaDB

**Read Replicas:**

You can reduce the load on your primary DB instance by routing read queries from your applications to the read replica. Using read replicas, you can elastically scale out beyond the capacity constraints of a single DB instance for read-heavy database workloads.

RDS read replicas can be Multi-AZ i.e. set up with their own standby instances in a different AZ.

Amazon RDS then uses the asynchronous replication method for the DB engine to update the read replica whenever there is a change to the primary DB instance.

Read replicas are supported by the MariaDB, MySQL, Oracle, PostgreSQL, Aurora.

Must have automatic backups turned on in order to deploy a read replica.

You can have up to 5 read replica copies of any database. You can have read replicas of read replicas.

**There are two different types of Backups for RDS**:

Automated Backups

Database Snapshots

**Automated Backups** allow you to recover your database to any point in time within a "retention period". The retention period can be between one and 35 days. Automated Backups will take a full daily snapshot and will also store transaction logs throughout the day. When you do a recovery, AWS will first choose the most recent daily back up, and then apply transaction logs relevant to that day. This allows you to do a point in time recovery down to a second, within the retention period.

Automated Backups are enabled by default. The backup data is stored in S3 and you get free storage space equal to the size of your database. So if you have an RDS instance of 10Gb, you will get 10Gb worth of storage

Backups are taken within a defined window. During the backup window, storage I/O may be suspended while your data is being backed up and you may experience elevated latency.

For Multi-AZ DB deployments, there is No I/O suspension since the backup is taken from the standby instance

First backup is a full backup, while the others are incremental.

**DB Snapshots** are done manually. They are stored even after you delete the original RDS instance, unlike automated backups. RDS keeps all manual DB snapshots until explicitly deleted

Whenever you restore either an Automatic Backup or a manual Snapshot, the restored version of the database will be a new RDS instance with a new DNS endpoint.

**Encryption at Rest:**

Encryption at rest is supported for MySQL, Oracle, SQL Server, PostgreSQL, MariDB & Autota. Encryption is done using the AWS Key Management Service (KMS) service. Once your RDS instance is encrypted, the data stored at rest in the underlying storage is encrypted, as are its automated backups, read replicas, and snapshots.